WHAT IS CLAIMED IS:

1. A method for determining a steady state battery terminal voltage comprising:

determining an equivalent charge resistance data at predetermined battery temperatures and predetermined states of charge (SOCs) for predetermined charge current ranges;

determining effective no load charge voltage data at the predetermined battery temperatures and the predetermined SOCs for the predetermined charge current ranges based on the equivalent charge resistance data;

calculating an equivalent charge resistance at a current charge current, a current battery temperature, and a current SOC, based on the equivalent charge resistance data;

calculating an effective no load charge voltage at the current charge current, the current battery temperature, and the current SOC, based on the effective no load charge voltage data; and

calculating the steady state battery terminal voltage at the current charge current, the current battery temperature, and the current SOC, based on the calculated equivalent charge resistance and the calculated effective no load charge voltage.

2. The method of claim 1, wherein the determining an equivalent charge resistance data comprises:

detecting first battery terminal voltages at each of the predetermined SOCs while charging a battery at each of the predetermined battery temperatures with first constant charge currents belonging to each of the predetermined charge current ranges;

detecting second battery terminal voltages at each of the predetermined SOCs while charging the battery at each of the predetermined battery temperatures with second constant charge currents belonging to each of the predetermined charge current ranges; and

determining the equivalent charge resistance data at the predetermined battery temperatures and the predetermined SOCs for each of the predetermined charge current ranges, based on the first constant charge currents, the first battery terminal voltages, the second constant charge currents, and the second battery terminal voltages.

3. The method of claim 2, wherein the equivalent charge resistance data $R_{cha\_e\_data}$ is calculated by the following equation:

$$R_{cha\_e\_data} = \left(\frac{V_2 - V_1}{I_2 - I_1} \right) @SOC$$

, where I_1 is the first constant charge current, I_2 is the second constant charge current, V_1 is the first battery terminal voltage, and V_2 is the second battery terminal voltage.

4. The method of claim 3, wherein the effective no load charge voltage data $V_{cha\_oc\_data}$ is calculated by one of the following equations:

$$V_{cha\_oc\_data} = V_2 + I_2 \times R_{cha\_e\_data} @SOC;$$

and

$$V_{cha\_oc\_data} = V_1 + I_1 \times R_{cha\_e\_data} @SOC.$$

5. The method of claim 1, wherein in the calculating an equivalent charge resistance, the equivalent charge resistance at the current charge current, the current battery temperature, and the current SOC is calculated based on the equivalent charge resistance data for the predetermined charge current range to which the current charge current belongs.

6. The method of claim 5, wherein in the calculating an equivalent charge resistance, the equivalent charge resistance is calculated through interpolation.

7. The method of claim 1, wherein in the calculating an effective no load charge voltage, the effective no load charge voltage at the current charge current, the current battery temperature, and the current SOC are calculated based on the effective no load charge voltage data for the predetermined charge current range to which the current charge current belongs.

8. The method of claim 7, wherein in the calculating an effective no load charge voltage, the effective no load charge voltage is calculated through interpolation.

9. The method of claim 1, wherein in the calculating a steady state battery

terminal voltage V_{cha_t}, the steady state battery terminal voltage at the current charge current, the battery temperature, and the current SOC is calculated by the following equation:

$$V_{cha\_t} = V_{cha\_oc} - I_{cha\_t} \times R_{cha\_e}$$

, where V_{cha_oc} is the effective no load charge voltage, I_{cha_t} is the current charge current, and R_{cha_e} is the equivalent charge resistance.

10. The method of claim 1, wherein the predetermined charge current ranges include a range where a charge current is less than 1C, a range where the charge current is between 1C and 5C, and a range where the charge current is greater than 5C.

11. A method for determining a steady state battery terminal voltage, comprising:

calculating an equivalent charge resistance at a current charge current, a current battery temperature, and a current state of charge (SOC), based on predetermined equivalent charge resistance data that is determined at predetermined battery temperatures and predetermined SOCs for predetermined charge current ranges;

calculating an effective no load charge voltage at the current charge current, the current battery temperature, and the current SOC, based on predetermined effective no load charge voltage data that is determined at the predetermined battery temperatures and the predetermined SOCs for the predetermined charge current ranges; and

calculating the steady state battery terminal voltage at the current charge current, the current battery temperature, and the current SOC, based on the calculated equivalent charge resistance and the calculated effective no load charge voltage.

12. The method of claim 11, wherein in the calculating an equivalent charge resistance, the equivalent charge resistance is calculated based on the current battery temperature, the current SOC, and the equivalent charge resistance data for the predetermined current range to which the current charge current belongs.

13. The method of claim 12, wherein the equivalent charge resistance is calculated through interpolation.

14. The method of claim 11, wherein in the calculating an effective no load charge voltage, the effective no load charge voltage is calculated based on the current battery temperature, the current SOC, and the equivalent no load charge voltage data for the predetermined charge current range to which the current charge current belongs.

15. The method of claim 14, wherein the effective no load charge voltage is calculated through interpolation.

16. The method of claim 11, wherein in the calculating a steady state battery terminal voltage, the steady state battery terminal voltage is calculated by the following equation:

$$V_{cha\_t} = V_{cha\_oc} - I_{cha\_t} \times R_{cha\_e}$$

, where V_{cha_oc} is the effective no load charge voltage, I_{cha_t} is the current charge current, and R_{cha_e} is the equivalent charge resistance.

17. A method for determining a steady state battery terminal voltage, comprising:

determining equivalent discharge resistance data at predetermined battery temperatures and predetermined depths of discharge (DODs) for predetermined discharge current ranges;

determining effective no load discharge voltage data at the predetermined battery temperatures and the predetermined DODs for the predetermined discharge current ranges on the basis of the equivalent discharge resistance data;

calculating an equivalent discharge resistance at a current discharge current, a current battery temperature, and a current DOD, based on the equivalent discharge resistance data;

calculating an effective no load discharge voltage at the current discharge current, the current battery temperature, and the current DOD, based on the effective no load discharge voltage data; and

calculating the steady state battery terminal voltage at the current discharge current, the current battery temperature, and the current DOD, based on the calculated equivalent discharge resistance and the calculated effective no load discharge voltage.

18. The method of claim 17, wherein the determining an equivalent discharge resistance data comprises:

detecting first battery terminal voltages at each of the predetermined DODs while discharging a battery at each of the predetermined battery temperatures with first constant discharge currents belonging to each of the predetermined discharge current ranges;

detecting second battery terminal voltages at each of the predetermined DODs while discharging the battery at each of the predetermined battery temperatures with second constant discharge currents belonging to each of the predetermined discharge current ranges; and

determining the equivalent discharge resistance data at the predetermined battery temperatures and the predetermined DODs for each of the predetermined discharge current ranges, based on the first constant discharge currents, the first battery terminal voltages, the second constant discharge currents, and the second battery terminal voltages.

19. The method of claim 18, wherein the equivalent discharge resistance data $R_{dch\_e\_data}$ is calculated by the following equation:

$$R_{dch\_e\_data} = \left(\frac{V_2 - V_1}{I_2 - I_1} \right) @ DOD$$

, where I_1 is the first constant discharge current, I_2 is the second constant discharge current, V_1 is the first battery terminal voltage, and V_2 is the second battery terminal voltage.

20. The method of claim 19, wherein the effective no load discharge voltage data $V_{dch\_oc\_data}$ is calculated by one of the following equations:

$$V_{dch\_oc\_data} = V_2 + I_2 \times R_{dch\_e\_data} @ DOD$$;

and

$$V_{dch\_oc\_data} = V_1 + I_1 \times R_{dch\_e\_data} @ DOD$$.

21. The method of claim 17, wherein in the calculating an equivalent discharge resistance, the equivalent discharge resistance at the current discharge current, the current battery temperature, and the current DOD are calculated based on the equivalent discharge resistance data for the predetermined discharge current range to which the current discharge current belongs.

22. The method of claim 21, wherein in the calculating an equivalent discharge resistance, the equivalent discharge resistance is calculated through interpolation.

23. The method of claim 17, wherein in the calculating an effective no load discharge voltage, the effective no load discharge voltage at the current discharge current, the current battery temperature, and the current DOD are calculated based on the effective no load discharge voltage data for the predetermined discharge current range to which the current discharge current belongs.

24. The method of claim 23, wherein in the calculating an effective no load discharge voltage, the effective no load discharge voltage is calculated through interpolation.

25. The method of claim 17, wherein in the calculating a steady state battery terminal voltage V_{dch_t}, the steady state battery terminal voltage at the current discharge current, the battery temperature, and the current DOD is calculated by the following equation:

$$V_{dch\_t} = V_{dch\_oc} - I_{dch\_t} \times R_{dch\_e}$$

, where V_{dch_oc} is the effective no load discharge voltage, I_{dch_t} is the current discharge current, and R_{dch_e} is the equivalent discharge resistance.

26. The method of claim 17, wherein the predetermined discharge current ranges include a range where a discharge current is less than 1C, a range where the discharge current is between 1C and 5C, and a range where the discharge current is greater than 5C.

27. A method for determining a steady state battery terminal voltage comprising:

calculating an equivalent discharge resistance at a current discharge current, a current battery temperature, and a current depth of discharge (DOD), based on predetermined equivalent discharge resistance data that are determined at predetermined battery temperatures and predetermined DODs for predetermined discharge current ranges;

calculating an effective no load discharge voltage at the current discharge current, the current battery temperature, and the current DOD, based on predetermined effective no load discharge voltage data that are determined at the predetermined battery temperatures and the predetermined DODs for the predetermined discharge current ranges; and

calculating the steady state battery terminal voltage at the current discharge current, the current battery temperature, and the current DOD, based on the calculated equivalent discharge resistance and the calculated effective no load discharge voltage.

28. The method of claim 27, wherein in the calculating an equivalent discharge resistance, the equivalent discharge resistance is calculated based on the current battery temperature, the current DOD, and the equivalent discharge resistance data for the predetermined current range to which the current discharge current belongs.

29. The method of claim 28, wherein the equivalent discharge resistance is calculated through interpolation.

30. The method of claim 27, wherein in the calculating an effective no load discharge voltage, the effective no load discharge voltage is calculated based on the current battery temperature, the current DOD, and the equivalent no load discharge voltage data for the predetermined discharge current range to which the current discharge current belongs.

31. The method of claim 30, wherein the effective no load discharge voltage is calculated through interpolation.

32. The method of claim 31, wherein in the calculating a steady state

battery terminal voltage, the steady state battery terminal voltage is calculated by the following equation:

$$V_{dch\_t} = V_{dch\_oc} - I_{dch\_t} \times R_{dch\_e}$$

, where V_{dch_oc} is the effective no load discharge voltage, I_{dch_t} is the current discharge current, and R_{dch_e} is the equivalent discharge resistance.